



## Development of Regionalized STEMI Care Networks in Brazil

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### Dear Editor,

We read with great interest the article by Caluza et al. “ST-Elevation myocardial infarction network: systematization in 205 cases reduced clinical events in the public health care system”. The creation of regionalized STEMI care networks, integrating different levels of complexity, reduces time interval until treatment, including door-to-needle and door-to-balloon time and increases the proportion of primary reperfusion, currently constituting a class I recommendation, level of evidence: B<sup>1,2</sup>. In fact, the implementation of STEMI care networks and systems has been a trend for more than a decade<sup>3</sup>, and, in 2011, through the “Line of care of acute myocardial infarction in the emergency care network”, the implementation of STEMI care networks in metropolitan regions became a recommendation of the Ministry of Health of Brazil<sup>4</sup>.

The aforementioned study drew our attention because we develop a similar initiative through the metropolitan Mobile Emergency Care Service (Samu) in the city of Salvador, state of Bahia, Brazil. In July 2009, we created an integrated regionalized network involving the entire public emergency

system of Salvador (city and state; emergency departments and general hospitals) and the two public cardiology referral centers with catheterization laboratory availability<sup>5</sup>.

When drawing a parallel with our local experience, we congratulate the authors of this network in Sao Paulo for the results regarding the transfer of 100% of patients to a referral center and the proportion of primary reperfusion, chemical or mechanical, of over 90%. In our cohort, due to a series of obstacles that are not the subject of this letter, just below 60% of the patients could benefit from transference to referral centers and we observed an overall proportion of primary reperfusion of 45% (excluding the 20% that sought medical care beyond the therapeutic window of 12 hours).

In time, no admission beyond the 12-hour window was reported in the São Paulo network. Were there any cases with this profile? How were they managed? Furthermore, are there records regarding the time intervals from symptom onset (pain-admission, admission-electrocardiogram, door-to-needle and/or door-to-balloon)?

We emphasize how praiseworthy the initiative of a STEMI care network implemented by Caluza et al. is, as well as the clinical results achieved. To our knowledge, there are not many such networks in Brazil and Latin America, in contradiction to the evidence and successful experiences in European countries and North America.

### Keywords

Myocardial Infarction; Urban Health Services; Emergency Medical Services; Ambulances; Brazil.

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## Reply

We appreciate the comments by Solla<sup>1</sup> about the article we published in the Brazilian Archives of Cardiology<sup>2</sup> (ABC) and agree that unfortunately in our country, the “networks” for treatment of myocardial infarction with ST elevation are still in their infancy, unlike well-established systems in

Europe<sup>3,4</sup> and in United States, as published by Cannon et al<sup>5</sup>. In this sense, it is interesting that our results, currently with 620 cases, are close to established networks as shown in Table 1 below, to which we added our experience according to what was published in JACC<sup>6</sup>.

**Table 1 – Reperfusion programs in STEMI**

	England/ MINAP 2003-2008	France/ FAST MI 2005	Canada VITAL 2000-2002	Austria/Vienna STEMI 2005-2008	Sweden RISK HIA 2005-2008	Brazil São Paulo 2010-2012
N	12888	331	119	191	883	592
Mean age	62.1	60.5	61.3	57.0	66.4	58.2
Women	21.8	20.5	24.4	28.6	27.0	24.7
Previous AMI	11.0	9.0	17.1	12.0	13.0	12.0
Previous CVA	2.0	1.0	No info	No info	5.0	4.9
Severe bleeding	0.9	1.2	10.9	3.1	3.5	1.0
Reinfarction	5.2	2.4	5.0	5.2	1.5	1.6
CVA	0.5	0.6	1.7	1.6	0.8	1.8
Hospital mortality	3.3	2.7	3.4	4.7	5.7	6.5

*Modified from JACC Intv (2011;4:877-83), adding data from São Paulo.*

We have followed the results of Solla, Filgueiras and Carvalho in Salvador, through presentations at national congresses and now with the publication of their article in *Circulation Outcomes*<sup>7</sup>; we offer our congratulations and acknowledge their results. We agree that the line of care for AMI adopted by the Ministry of Health and supported by the Brazilian Society of Cardiology is a step in the right direction.

Regarding the questions specifically formulated by the authors:

1) We did not include in this sample, and we apologize if we were not clear enough in the article, patients with more than 12-hour evolution; currently, these cases fortunately comprise a small proportion of patients in the network, (less than 10% of total in Hospital São Paulo). This is due to the fact that care systematization and Telecardio virtually eliminated time loss caused by transferring patients from one place to another, until you have reached a diagnosis and treatment is initiated. The cases that did not undergo reperfusion had specific reasons: neoplasms undergoing treatment, pericarditis diagnosis, trauma postoperative period, recent coronary angiography, finding of occluded small vessels. The very few cases included with more than 12 hours of symptom onset were due to persistent and significant pain;

2) Some time intervals in our experience: median of time from onset to needle of 3.5 hours; onset to balloon, 93 minutes (primary PCI) and onset to catheterization in invasive drug

cases, of little more than 9 hours. These data reflect the fast use of Tenecteplase (TNK) and not too prolonged transfer, preventing deterioration of patients at the points of origin, with consequent contribution to the low mortality achieved;

3) Electrocardiogram (ECG) interpretation made by the Telecardio system of Hospital São Paulo, for Samu and AMA participants had a time of diagnostic information of less than 2 minutes. For ECGs performed in the participating ERs, this time interval was greater, with a median of 17 minutes in cases with complete information available.

Our systematization requires that the patient being submitted to primary PCI have a diagnosis-to-balloon time of less than 90 minutes, except in cases of absolute contraindication to thrombolysis. Under these conditions, the outcome, currently comprising 620 cases, considering the limitations of a registry, showed no significant difference in mortality after the use of TNK followed by coronary angiography/intervention if necessary (80% of sample) versus primary angioplasty, with a hospital mortality rate of 6.5%.

**Sincerely,**

Ana Christina Vellozo Caluza

Antonio Carlos Carvalho

On behalf of the other authors

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